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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,853	09/22/2005	Philippe Meunier-Beillard	NL03 0357 US1	6408

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EXAMINER	
NGUYEN, KHIEM D	
ART UNIT	**PAPER NUMBER**
2823	

NOTIFICATION DATE	DELIVERY MODE
09/17/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

Office Action Summary	Application No.	Applicant(s)	
	10/550,853	MEUNIER-BEILLARD ET AL.	
	Examiner	Art Unit	
	Khiem D. Nguyen	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 July 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

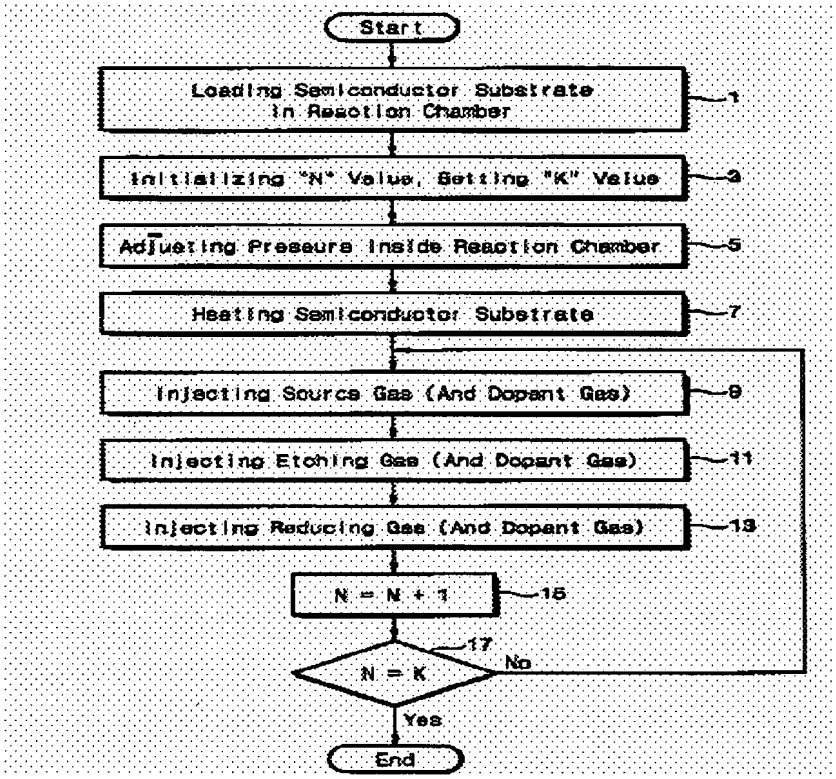
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5 and 7-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Park et al. (U.S. Patent 6,391,749).

In re claim 1, **Park** discloses a method of manufacturing a semiconductor device with a semiconductor body comprising silicon (col. 3, lines 31-47) provided with an n-type doped semiconductor region comprising silicon formed by an epitaxial deposition process (col. 3, lines 13-30), wherein the epitaxial deposition process of the n-type region is performed by positioning the semiconductor body in an epitaxial reactor and introducing in the reactor a first gas stream comprising a carrier gas (hydrogen) (col. 5, lines 11-28) and further gas streams comprising a gaseous compound comprising silicon (silane (SiH_4) and (dichlorosilane (SiH_2Cl_2)) (col. 3, lines 39-47) and a gaseous compound comprising an element from the fifth column of the periodic system of elements (phosphine) (col. 4, lines 50-56), while heating the semiconductor body to a growth temperature (Tg) (450 to 800° C) (col. 3, lines 29-30) and using an inert gas as the carrier gas, characterized in that for the gaseous compound comprising silicon a mixture is chosen of a first gaseous silicon compound (silane) (SiH_4) which is free of

chlorine and a second gaseous silicon compound (dichlorosilane) (SiH_2Cl_2) comprising chlorine (col. 3, lines 31-46 and FIG. 2).



In re claim 2, as applied to claim 1 above, **Park** discloses all claimed limitations including the limitation characterized in that the first gaseous silicon compound silane (SiH_4) is chosen and for the second gaseous silicon compound dichlorosilane (SiH_2Cl_2) is chosen (col. 3, lines 31-47).

In re claim 3, as applied to claim 1 above, **Park** discloses all claimed limitations including the limitation characterized in that for the gaseous compound comprising a V-element, phosphine is chosen (col. 4, lines 50-56).

In re claim 4, as applied to claim 1 above, **Park** discloses all claimed limitations including the limitation characterized in that for the growth temperature (Tg) a temperature in the range between 450C to 800 °C is chosen (col. 3, lines 29-30).

In re claim 5, as applied to claim 1 above, **Park** discloses all claimed limitations including the limitation characterized in that the epitaxial deposition process is performed at reduced pressure (P) (col. 3, lines 27-31).

In re claim 7, as applied to claim 1 above, **Park** discloses all claimed limitations including the limitation characterized in that for the semiconductor device a MOSFET device is chosen and the semiconductor region is formed as a source or drain of the MOSFET device (col. 4, line 59 to col. 5, line 10).

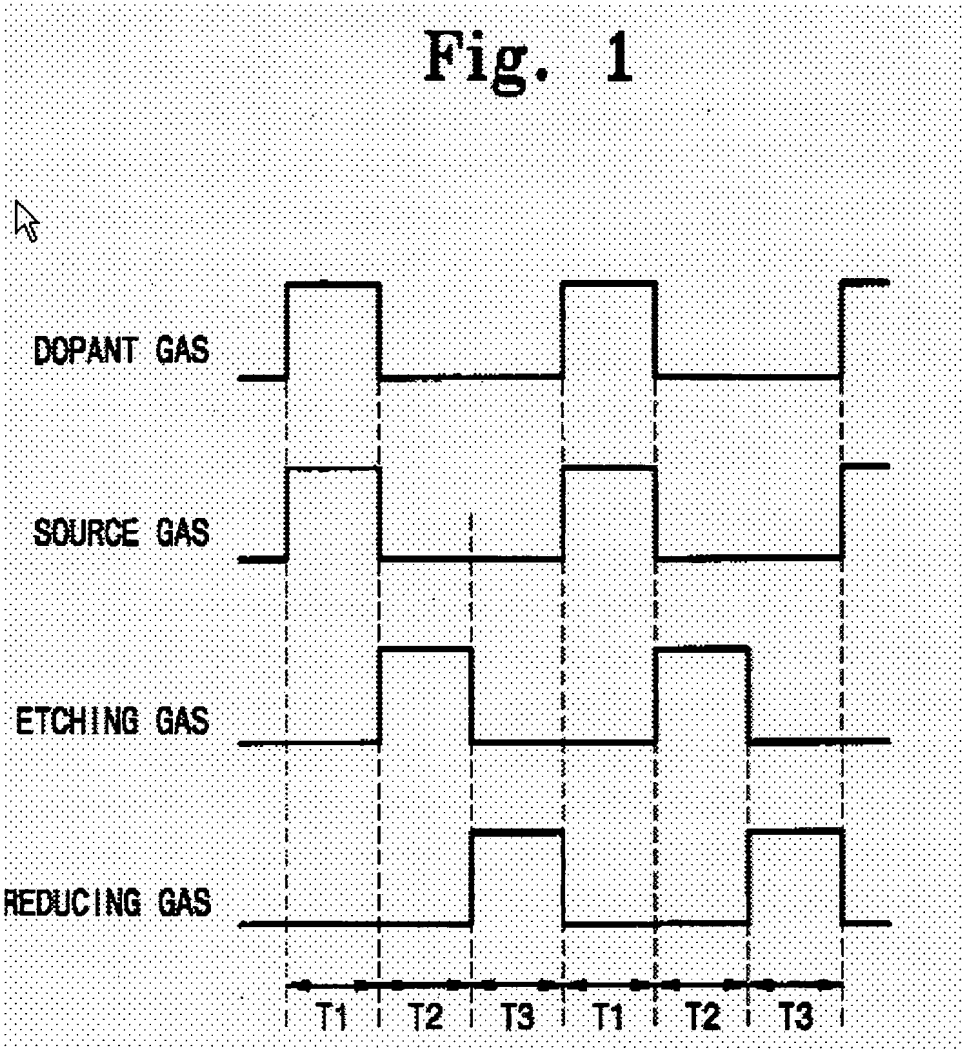
In re claim 8, as applied to claim 1 above, **Park** discloses all claimed limitations including the limitation characterized in that the after the growth of the n-type semiconductor region comprising silicon the deposition process is continued with the growth of a further semiconductor region comprising a lower n-type doping than the semiconductor region or comprising a p-type doping and in that at least between the growth of the semiconductor region and the growth of the further semiconductor region, the inert carrier gas is replaced by a carrier gas comprising hydrogen (col. 5, lines 11-28).

In re claim 9, as applied to claim 1 above, **Park** discloses all claimed limitations including the limitation characterized in that after growth of the semiconductor region, the carrier gas of an inert gas is maintained in a first short period of a cycle of three short periods, the carrier gas is replaced by hydrogen during the second short period and the carrier gas is switched back to the inert gas during the third short period in which the

deposition process is continued but without the presence of the gaseous compound of the V-element (col. 5, lines 11-28).

In re claim 10, as applied to claim 9 above, **Park** discloses all claimed limitations including the limitation characterized in that the cycle of three periods (T1, T2, T3) is repeated a number of times (col. 4, lines 45-56 and FIG. 1).

Fig. 1



In re claim 11, as applied to claim 8 above, **Park** discloses all claimed limitations including the limitation characterized in that during the deposition of the further semiconductor region, the gas stream of the gaseous compound with the V-element is

chosen to be zero and replaced by another gas stream comprising a gaseous compound comprising an element of the third column of the periodic system of the elements, resulting in a device comprising a p-type further semiconductor region on top of the n-type semiconductor region (col. 5, lines 11-28).

In re claim 12, as applied to claim 11 above, **Park** discloses all claimed limitations including the limitation characterized in that for the semiconductor device a pnp bipolar transistor is chosen of which the n-type base region is formed by the n-type semiconductor region and the p-type emitter regions is formed by the further semiconductor region (col. 4, line 59 to col. 5, line 10).

In re claim 13, as applied to claim 1 above, **Park** discloses all claimed limitations including the limitation characterized in that nitrogen is chosen as the inert gas (col. 5, line 11-28).

In re claim 14, as applied to claim 1 above, **Park** discloses all claimed limitations including the limitation characterized in that the semiconductor region or the further semiconductor region are formed as a mixed crystal of silicon and germanium by leading a yet another gas stream to the reactor comprising a gaseous compound of germanium (col. 2, lines 6-13).

In re claim 15, as applied to claim 10 above, **Park** discloses the semiconductor device obtained by the method as recited in claim 1 (col. 3, line 12 to col. 4, line 56).

In re claim 16, as applied to claim 1 above, **Park** discloses all claimed limitations including the limitation characterized in that the apparatus comprises a deposition reactor and is provided with a first source for a gaseous compound of silicon (silane) (SiH_4)

which is free of chlorine and a second source for a gaseous compound of silicon (dichlorosilane) (SiH_2Cl_2) which comprises chlorine (col. 3, lines 31-47).

In re claim 17, as applied to claim 16 above, **Park** discloses all claimed limitations including the limitation characterized in that it is provided with a first carrier gas source comprising an inert gas and a second carrier gas source comprising hydrogen and with means to switch the carrier gas from the inert gas to hydrogen during the deposition processv (col. 5, lines 11-28).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. (U.S. Patent 6,391,749).

In re claim 6, as applied to claim 5 Paragraph 4 above, **Park** discloses all the claimed limitations including after loading the semiconductor substrate into the chamber, the chamber is evacuated using a vacuum pump, to maintain a pressure lower than atmospheric pressure (col. 1, lines 65-67) but does not explicitly discloses wherein the pressure (P) is chosen between 120 and 160 Torr.

However, there is no evidence indicating the pressure range is critical and it has been held that it is not inventive to discover the optimum or workable pressure range of a result-effective variable within given prior art conditions by routine experimentation. See

MPEP § 2144.05. Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising there from. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Response to Applicants' Amendment and Arguments

5. Applicants' arguments filed July 03rd, 2007 have been fully considered but they are not persuasive.

Applicants contend that the Park et al. reference (U.S. Patent 6,391,749), herein known as Park do not correspond to claimed limitations directed to using an inert gas as a carrier gas.

In response to Applicants' claimed invention that Park et al. do not teach or suggest using an inert gas as the carrier gas, Examiner respectfully disagrees.

Applicants' attention is respectfully directed to (col. 3, lines 48-59) and (col. 5, lines 11-28), where Park et al. suggest using a hydrogen (H_2) gas as the carrier gas. Similar to the Applicants' claimed invention, Park et al. disclose a gaseous compound comprising a silicon mixture chosen from a first gaseous silicon compound (free of chlorine, silane (SiH_4)) and a second gaseous silicon compound (having chlorine, dichlorosilane (SiH_2Cl_2)) (col. 3, lines 48-59), a gaseous compound comprising an element from the fifth column of the periodic system of elements (phosphine, PH_3) (col. 4, lines 45-56), and a carrier gas (hydrogen) (col. 5, lines 11-28).

For this reason, Examiner holds the rejection proper.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Correspondence

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D. Nguyen whose telephone number is (571) 272-1865. The examiner can normally be reached on Monday-Friday (8:30 AM - 5:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KN
September 07, 2007

Brook Kebede
BROOK KEBEDE
PRIMARY EXAMINER